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ABSTRACT

This paper states that the real gains in collecting data on the educational system appear to lie in discovering more about the relationships between schools and what they produce. The required data, which could be collected fairly cheaply from existing records, include (1) education outputs as measured by grade level completion, college attendance, and achievement scores; (2) family outputs as measured by parental occupation, parental education, and family structure; and (3) school inputs as measured by school of attendance, special programs, and specific teachers in each year along with the characteristics of the teachers. All these data should be collected annually for each student in the system. Additional avenues of research that seem to be profitable include both broadening the scope of school output measures and ascertaining the contribution of each school output measure to future life styles. (Author)

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DEVELOPING LOCAL EDUCATIONAL INDICATORS -- THE PRIORITIES

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DEVELOPING LOCAL EDUCATIONAL INDICATORS--THE PRIORITIES

by Eric A. Hanushek*

There has been considerable discussion about development of a set of social indicators. This discussion has mostly been at the national level and is well summarized by Mancur Olson's work of Toward a Social Report.** However, since a number of the areas grouped under social indicators such as education, public safety, housing and political participation have traditionally fallen into the bailiwick of local governments, it is inevitable that emphasis will soon shift to social indicators at a local level. The following paper delineates a set of priorities in local data collection for educational indicators. This discussion is an outgrowth of one of the first inquiries into local social indicators, sponsored by the City of Chicago.***

The development of a set of social indicators at the local level is, without doubt, a significant step toward better management of local government. Today decisions are required in a number of areas for which there is the scantiest information available but for which there are important consequences for the citizens of the community. This is particularly true in the case of education where almost every facet of

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**U.S. Department of Health, Education and Welfare, Toward a Social Report (Washington, D.C.: Government Printing Office, 1969).

***Department of Development and Planning, City of Chicago, Social Indicator Conference, June 15-16, 1970.

life is affected. Few people would doubt that education exerts its influence on the income, employment opportunities, health and family life of the individual. From a societal point of view education is charged with correcting many of the societal problems such as distortions in income distributions and racial tensions. Yet it is phenomenal how little we know about the education of individuals. It is just in the last five years that efforts have been made to understand the relationships between the various inputs to the educational process and the outputs or results of education. I believe that the heart of any effort in educational data collection should be an attempt to understand more about such input-output relationships.

In order to be useful in decision making it must be possible to link any set of social, or more specifically educational, indicators to alternative courses of public action. The term social indicators has tended to connote a set of output or final effect measurements. For instance, in housing one is led to quality measures such as per cent substandard; in health there is the infant mortality rate; and in public safety there are various crime rates by type of crime. However, to be useful for public policy a set of social indicators must contain data about more than just the outputs of various activities. Policy usefulness requires two additional bits of information. While the goals in an area should be linked to the output measures, the policy measures contemplated are almost never ones that work directly on the output measures. Instead, changes in the output measures are brought about by changing a different set of variables--a set of input variables. Thus, the second bit of information needed in assessing policy alternatives through analyzing a

set of social indicators is the value of input variables which correspond to the output measures. The final information needed for policy is the causal relationship which links the input variables to the outputs or policy objectives. The presence of all three of these elements is what has made the Commerce Department monthly publication of Economic Indicators so useful in decision making. This publication contains data on both the input and output variables, and economists understand fairly well the relationships among various measures of the condition of the economy. For example, when fluctuations in aggregate national income are observed, the economist recognizes certain causal relationships which exist in the economy and can adjust certain policy variables such as the government deficit or the money supply in order to ameliorate these fluctuations in income. The absence of knowledge about these causal relationships is also what makes the development of a set of social indicators much more difficult. The relationships between various education or health or family policies and their effects on the state of these characteristics for the community are much less understood. Within education, little is known about how to boost achievement. Do you hire more teachers with Master's degrees? Do you reduce class size?

My proposal for local educational indicators calls for developing a data base and an analytical framework from which decisions about educational policy can be made. In order to set the stage for this discussion let me discuss what I think are key points about education and what we know about education. I will also delineate a set of priorities based upon my views of the present state of knowledge, the needs and costs of various aspects of the data collection and analysis scheme.

The real concern in developing local educational indicators is what the local school system is doing for the children in the community. While there are some concerns with the educational distribution of the present adult population, most policy is aimed at the present school children or the future adult population. Therefore, I will confine my remarks to considerations of the elementary and secondary school system with very little discussion of the possibilities for adult education or post-secondary education.

Educational Outputs

Decisions about education should be made on the basis of outputs from the educational system. Before proceeding, we should understand the nature and measurement of educational output. Education is conceptually different from the other items being considered as aspects of the quality of life in the community. Education usually is not valued in and of itself. Instead, its value is derived from its contribution to other aspects of life. Education is what an economist would call an intermediate good; that is, a good which is an input to another "final" good where the final good is the one which is demanded by society. Thus, the value of education is usually associated with the income of an individual or the employment opportunities of the individual or such concepts as citizenship or community participation. The intermediate good character of education implies that many of the other measures of quality of life-- ncome, employment rates, health, crime rates--at least partially reflect the quality of education in the community.

There are several reasons, however, why these final demand measures of education are not as useful for public policy as other possible

measures. First, education is only one of a set of inputs that leads to any of the final measures--say income. Therefore, an improvement in income may or may not reflect an improvement in education within the community. Second, the effects of education are only evidenced several years after the education is completed as in the case of increased income or voter participation. Thus, the large time lag in data collection would make it difficult to monitor and change the educational system as indicated by the measured output conditions. Finally, at the local level measuring the impact of education when the above time discrepancies in input and output exist causes another set of problems. Since less than half of the population of Chicago lived in the same house in 1960 as in 1955, it is difficult after a few years to attribute the effects of education to any specific inputs of the Chicago public school. Further, one would not want to advocate any given public policy on the basis of measurement of Chicago population characteristics some time very long after the schooling period. Certainly, Chicago is not atypical in this regard.

Therefore, while the real interest in education centers upon the levels of income, employment, crime, voting, etc., these measures are not very useful for public policy. Instead, it would be desirable to have contemporaneous measures of the impact present schooling will have on these final demand areas. The most concern has been placed on the skill dimension of schools which is related to the conceptual measures of income, occupation and employment. Three contemporaneous measures of skill output appear to be important and readily available. These measures are whether a student goes to college or not, the quantity of precollege

education received in years of schooling, and the quality of education.* Evidence suggests that these factors are important in explaining incomes, occupational choices and employment rates of individuals.

College continuation and length of schooling are easily measured, but the measure for quality of schooling is less obvious. A variety of measures could be used ranging from college scholarships to breadth of curriculum to scores on standardized achievement tests. The last measure--achievement test scores which allow standardized comparisons of schools and systems--has received the most attention in recent analyses of education. This arises from the national interest raised by Equality of Educational Opportunity** (the Coleman Report), the 1965 national survey by the U.S. Office of Education, which showed large achievement differences at all grade levels in different regions and by different races. At the same time, there is evidence that cognitive development as measured by such achievement tests is valued in terms of skills represented. By adjusting scores to grade level equivalents, it is possible to arrive at the dollar value of a quality equivalent year of schooling. The evidence suggests to me that standardized test scores are a useful way to assess educational quality.***

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*See particularly Randall D. Weiss, "The Effect of Education on the Earnings of Blacks and Whites," Review of Economics and Statistics, May 1970.

**James S. Coleman, et al., Equality of Educational Opportunity (Washington, D.C.: Government Printing Office, 1966). This report was produced in response to a requirement in the Civil Rights Act of 1964.

***Weiss, "The Effect of Education."

First Priority Data

However, merely recording the values of these contemporaneous measures of output and tracking them over time for the city is not enough. Indeed, most superintendents of schools already do this, sometimes even for individual school buildings. Except for some additional publicity for the present state of education, the duplication of this effort would not be very valuable. What I suggest is collecting these data in such a manner that information about the relationships between various inputs--things that are available to the public policy maker--and these outputs can be derived. This type of effort, if carried out over a number of years, could provide a wealth of data heretofore unavailable any place.

Specifically, I believe the highest priority should be placed upon collecting data on both the outputs of education and the inputs to the educational process. The details of such a scheme follow some work I have done with a California school system; that work can be considered a prototype for what I believe is the next step in better understanding the educational process and, thus, in providing decision makers with the information needed to develop educational policy. The main thrust of that work was taking information which was readily available in cumulative records for individual students and trying to ascertain what schools do for children in the way of increasing their achievement.

Educational output as measured by college continuation, length of time in school or quality expressed in achievement test scores can be looked upon as a function of the family background of the individuals,

the background of his peers and the inputs supplied by the school--in particular the teachers and specific programs supplied each child. There have been several recent attempts to sort out the influence of each of these through statistical procedures. If the separate influences of each of these factors can be estimated, it is possible to examine the efficacy of various policies. However, these past studies have all been inconclusive because the appropriate data have not been available. Although the educational process depends upon the cumulative history of past inputs, all of these past studies have lacked historical information on the various inputs to education. Further, while interest centers upon the education of individual children, past studies have not recorded the specific inputs, especially the specific school inputs, relevant to the individual child. These limitations have introduced a series of biases into the analysis which have severely limited the usefulness for the policy maker.

However, as indicated by my work during the past year, this type of data on the inputs to the education of individual children is quite easy and relatively cheap for any individual city to collect. At most it would seem to require slightly different administrative procedures from the present system. At the present time, cumulative records contain the suggested measures of output; achievement test scores, whether or not a student completes the twelfth grade and, if so, whether or not he continues to college are readily available. The cumulative student files also carry the required background information on the family (occupation and/or education of parents, family structure, etc.), although some procedure might have to be instituted to update this information at given intervals.

Finally, the cumulative records of students carry the names of teachers and the scholastic history of the student. A recording scheme for individual programs such as remedial reading or guidance counseling could also be instituted. Presently, it should not be difficult or expensive to collect these data for analysis. The work I have done has been aimed further at identifying the specific attributes of teachers such as experience or advanced degrees which contribute to the education of different children. It would be fairly straightforward to merge information on the characteristics of specific teachers from personnel records with the individual student's performance.

There are a variety of statistical analyses which would be profitable and possible from such data, particularly if they were collected on the same group of students each year of school over some period of time. There are many policy questions which are today unanswered to which these data pertain directly. For example, what programs are best for minority children? For children from educationally deprived backgrounds? For children who move frequently? What is the effect of racial and social segregation on education? Which teachers and schools are contributing most to the educational output of children? What are the characteristics of a "good" school and a "bad" teacher or school (measured in terms of additions to the education of students)? The work I have done in this area suggests that such a data collection and analytical design is feasible, relatively cheap and potentially a most useful type of undertaking for the policy maker.

Second Priority Data

The study just outlined, however, does not represent the only possible or worthwhile study. There are certain other approaches to assessing the state of education which I might suggest at the same time, although they would be more expensive and must assume a lower priority than the study previously described.

The next area of data collection and analysis in terms of priority seems to be the development of a broader range of output measures for schools. Schools are given a larger job than just development of cognitive ability. One important aspect of schools not considered in the previously mentioned output measures can be lumped under the title socialization. This area encompasses the development of attitudes toward education and society, instilling notions about moral and ethical values, promoting participation in democratic processes, and, in general, providing a framework for assimilation into society. This is certainly an important aspect of schooling. Nevertheless, it has been very much neglected, at least from an analysis point of view.

There have been some isolated attempts at measuring part of the socialization dimension of schools. For example, the Coleman Report in surveying students asked them questions about their ambitions regarding schooling and the extent to which they felt they could control their own destiny. Yet, there has been little effort at systematically studying these aspects of schools and their relationship to performance in society.

The initial measures that would be fairly easily obtained and that appear to capture some parts of this socialization dimension would include: school absentee rates, school dropout rates, juvenile

delinquency rates, and possibly some measure of voter registration or voter turnout among youth. Absentee rates and dropout rates would provide some indication of the views of students toward schools; juvenile delinquency rates would indicate modes of societal behavior; and voter data would supply some information about the participation of people in society. None of these measures are completely satisfying--their chief attribute is relative ease of data collection. A better but considerably more costly attack would call for the direct attitude surveying of a sample of students. It should be possible to devise an attitude questionnaire which gives insights into how students view schools, view society, and view their role in society. If this survey were given at several points in time, it would be possible to analyze the ability of schools and specific teachers to change attitudes. (Here I am again considering that the individual skill analysis is being carried out and that this could be added to that initial effort.) The analysis would proceed in a manner very similar to the analysis of the skill dimension. Statistical analysis could be used to estimate the separate influences of families, peers and teachers on the socialization outputs for students.

Another additional effort which has merit at this point is assessing the relationships between measures of both skill and socialization dimensions of education and success in life. There has been some work, as mentioned previously, which links skill measures with income, occupation and employment patterns. Yet, this has not been without fault, and there is considerable to be learned in this area. Further, in keeping with the spirit of social indicators, the effects of education on other aspects of life such as health or family stability seems warranted. To my knowledge,

this type of work has never been done. The same discussion applies equally to the socialization dimension. For example, it has been hypothesized that the primary output of schools as far as future employers are concerned is not knowledge but discipline for future labor force members. This and the previous questions could be analyzed by following a group of students after they leave the school and ascertaining what their income streams, occupational pattern, family structure, health conditions, etc. have been upon leaving school. A word of caution here, however--such data collection schemes are very expensive.

Assessing Education

Finally, a short discussion of how one can assess the current position of a city's educational system might help to sharpen the focus of the previous discussion. It is possible to aggregate the information on outputs for individuals in a variety of ways. These aggregations supply ways of measuring the present position of the system.

From looking at the types of measures suggested it is evident that there is no absolute scale to the data. The information collected is not of the character of determining how many people can do a given long division problem. Instead at least in the skill dimension the data are concerned with the quality equivalent grade level at which individuals are achieving. But we know that the amount of knowledge at any given grade level has increased dramatically over time. While the Sputnik reaction brought this home to the public, 1957 was not the beginning. Given that there is no scale to make absolute statement, the attention must be centered upon relative measures, i.e., how students in one area

are doing relative to students in a different area.

There are two focal points for this relative comparison. First, how well is the city doing in comparison to other cities in the country? Second, and possibly most important for the city in terms of public policy, how well is the city doing at equalizing educational opportunity throughout the city? In other words, how is one group of students in one area--say the blacks in a ghetto--doing relative to other groups in the city? Both questions are certainly important, but it is the latter one which has focused the most attention on education in recent years.

The first question requires only city averages. The types of information gained from such an analysis are similar to those derived from the Coleman Report such as "the average 12th grade white in the metropolitan Midwest is .4 grade levels in reading behind the average 12th grader in the metropolitan Northeast." The comparisons could be made for the city on all measures as compared with other locales. (The interest in such comparisons is another reason for relying upon the fairly standard and easily obtainable skill measures described previously instead of pushing toward new measures here.)

Evaluation of the equilization outcomes of the schools requires the data to be aggregated for racial and ethnic groups within the city. This would yield city specific information along Coleman Report lines such as "in quality terms for reading the average 12th grade Negro in the metropolitan Midwest is almost three years behind a 12th grade white in the same region."

These are natural ways of assessing the school system. However, as pointed out previously, many of these comparisons can be accomplished

now from the school system publications. Once these comparisons are made, however, little is gained unless one knows which policies are likely to be useful in changing the outputs. This requires a knowledge of the input-output relationships which exist.

Summary

Let me quickly summarize the previous discussion. The real gains in collecting data on the educational system appear to lie in the area of discovering more about the relationships between schools and what they produce. The required data could be collected fairly cheaply from existing records. The data which are required include: 1) outputs of education as measured by grade level completion, college attendance and achievement scores; 2) family inputs as measured by parental occupation, parental education, and family structure; and 3) school inputs as measured by school of attendance, special programs, and specific teachers in each year along with the characteristics of the teachers. All of these data should be collected for each student in the system annually. This would provide a tremendous data base from which analysis could start within a couple of years.

Additional avenues of research which seem to be profitable at this time include both broadening the scope of school output measures and ascertaining the contribution of each school output measure to future life style. While both of these appear researchable and useful at this time, They must be weighed against their expense which could be fairly large.

These projects certainly aren't the only projects possible. They represent my view of what we now know about education and what we need to know next.